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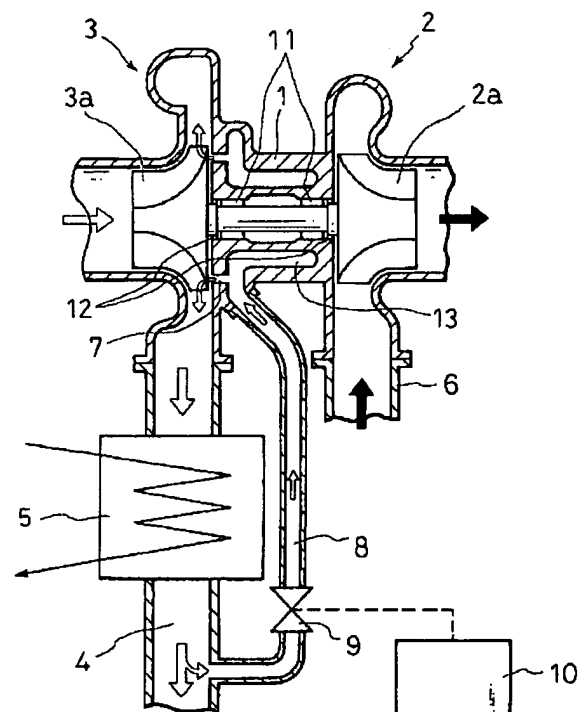
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(54) 【発明の名称】 エンジンの過給機冷却装置

(57) 【要約】

【目的】本発明は、エンジンの高回転、高負荷時又はコンプレッサの出口圧の高い時において、過給機のコンプレッサのアルミ鋳造製羽根車のクリープ強度、疲労強度を低下するおそれがなく、又軸受及びそのシール部の熱変形を発生させることなく実用運転を可能とする。

【構成】過給機1のコンプレッサ3からエンジンのインテークマニホールドに接続する吸気管4に備えたインタークーラ5の下流側と前記コンプレッサ3及び排気タービン2とコンプレッサ3との軸受11の外周に設けた環状のポケット13とを冷却空気配管8により接続し、この冷却空気配管8に電磁弁9を設け、この電磁弁9を過給機1の運転状況に応じて開閉制御するコントローラ10を備えた構成を特徴とする。



【特許請求の範囲】

【請求項1】 排気タービンと、この排気タービンによって回転するコンプレッサとからなるエンジンの過給機において、前記コンプレッサからエンジンのインテークマニホールドに接続する吸気系路に備えたインタークーラの下流側と前記コンプレッサとを冷却空気配管により接続し、この冷却空気配管路に電磁弁を設け、この電磁弁を過給機の運転状況に応じて開閉制御するコントローラを備えたことを特徴とするエンジンの過給機冷却装置。

【請求項2】 排気タービンと、この排気タービンによって回転するコンプレッサとからなるエンジンの過給機において、前記コンプレッサからエンジンのインテークマニホールドに接続する吸気系路に備えたインタークーラの下流側と前記コンプレッサとを冷却空気配管により接続すると共に、前記排気タービンとコンプレッサとの軸受の外周に環状のポケットを設け、このポケットと前記冷却空気配管とを接続し、この冷却空気配管路に電磁弁を設け、この電磁弁を過給機の運転状況に応じて開閉制御するコントローラを備えたことを特徴とするエンジンの過給機冷却装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、エンジンの過給機冷却装置に関するものである。

【0002】

【従来の技術】エンジンの過給機は周知の通り排気タービンと、この排気タービンによって回転するコンプレッサとから構成されている。

【0003】

【発明が解決しようとする課題】コンプレッサの羽根車がアルミ鋳造製の場合、高回転、高圧力比で運転すると、羽根車の外周部が高温になり、材料のクリープ強度、疲労強度が低下し、実用運転が困難になるおそれがあった。また、タービン側軸受シール部の熱変形により潤滑油や排気ガスが漏洩する問題があった。

【0004】本発明の目的は、上記の問題を解消したエンジンの過給機冷却装置を提供することである。

【0005】

【課題を解決するための手段】上記の目的を達成するための本発明の要旨は、排気タービンと、この排気タービンによって回転するコンプレッサとからなるエンジンの過給機において、前記コンプレッサからエンジンのインテークマニホールドに接続する吸気系路に備えたインタークーラの下流側と前記コンプレッサとを冷却空気配管により接続し、この冷却空気配管路に電磁弁を設け、この電磁弁を過給機の運転状況に応じて開閉制御するコントローラを備えたものである。

【0006】排気タービンと、この排気タービンによって回転するコンプレッサとからなるエンジンの過給機に

において、前記コンプレッサからエンジンのインテークマニホールドに接続する吸気系路に備えたインタークーラの下流側と前記コンプレッサとを冷却空気配管により接続すると共に、前記排気タービンとコンプレッサとの軸受の外周に環状のポケットを設け、このポケットと前記冷却空気配管とを接続し、この冷却空気配管路に電磁弁を設け、この電磁弁を過給機の運転状況に応じて開閉制御するコントローラを備えたものである。

【0007】

10 【作用】上記の構成により、過給機が高回転、高圧力比で運転される状況では電磁弁を開口し、インタークーラで冷却された吸気の一部を冷却空気配管によりコンプレッサ及び軸受部に供給し、軸受部及び羽根車を強制的に冷却する。

【0008】

20 【実施例】以下本発明の実施例を図面に基づいて説明する。図1において、1は過給機であり、羽根車2aを有する排気タービン2と、この排気タービン2によって回転する羽根車3aを備えたコンプレッサ3とから構成されている。

【0009】前記排気タービン2は図略のエキゾーストマニホールドと排気管6で接続され、また、前記コンプレッサ3は図略のインテークマニホールドと吸気管4で接続されている。

【0010】また、前記吸気管4の途中にはコンプレッサ2により温度上昇した吸気を冷却するインタークーラ5が配置されている。

【0011】本発明は、前記インタークーラ5の下流側と前記コンプレッサ3の羽根車3aの外周部と対応する位置にスリット7を設け、前記インタークーラ5の下流側と前記スリット7とを冷却空気配管8により接続し、この冷却空気配管8の途中に電磁弁9を設け、この電磁弁9を過給機1の運転状況に応じて開閉制御するコントローラ10を備えた構造である。

【0012】また、前記の構造に加えて、排気タービン2の羽根車2aとコンプレッサ3の羽根車3aとの軸受11の外周に環状のポケット13を設け、このポケット13と前記冷却空気配管8とを接続したものである。

【0013】前記電磁弁9をコントローラ10により開閉制御する過給機1の運転状況とは、エンジンの回転、負荷又はコンプレッサ3の出口圧をコントローラ10に入力し、エンジンの高回転、高負荷時又はコンプレッサ3の出口圧の高い時に電磁弁9を開口制御することである。

【0014】本発明は上記の通りの構造であるから、エンジンの回転、負荷又はコンプレッサ3の出口圧がコンプレッサ3の羽根車3aに影響を及ぼさない領域では電磁弁9は閉じている。

【0015】しかし、コンプレッサ3の羽根車3aに影響を及ぼすエンジンの高回転、高負荷時又はコンプレッ

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ができ、前記の構成に排気タービンとコンプレッサとの軸受の外周に環状のポケットを設け、このポケットと前記冷却空気配管とを接続し、この冷却空気配管路に電磁弁を設け、この電磁弁を過給機の運転状況に応じて開閉制御するコントローラを備えた構成では、前記の効果に加えて軸受及びそのシール部の熱変形を発生させることなく実用運転を可能とする効果を有している。

【図面の簡単な説明】

【図1】本発明装置の要部断面図

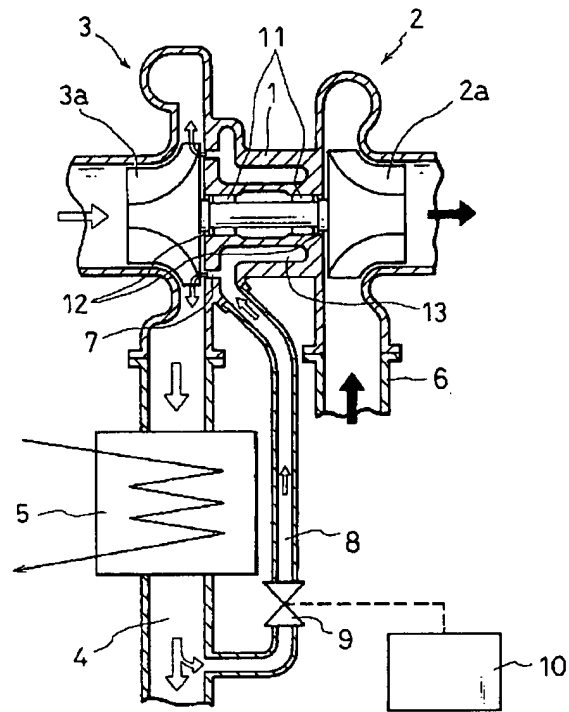
【符号の説明】

- 1 過給機
- 2 排気タービン
- 2 a 排気タービンの羽根車
- 3 コンプレッサ
- 3 a コンプレッサの羽根車
- 4 吸気管
- 5 インテーククーラ
- 6 排気管
- 5 排気通路
- 6 インタクーラ
- 7 スリット
- 8 冷却空気配管
- 9 電磁弁路
- 10 コントローラ
- 11 軸受
- 12 シール部
- 13 ポケット

【0018】

【発明の効果】以上のように本発明は、過給機のコンプレッサからエンジンのインテークマニホールドに接続する吸気系路に備えたインタークーラの下流側と前記コンプレッサとを冷却空気配管により接続し、この冷却空気配管路に電磁弁を設け、この電磁弁を過給機の運転状況に応じて開閉制御するコントローラを備えた構成であるから、エンジンの高回転、高負荷時又はコンプレッサの出口圧の高い時において、コンプレッサのアルミ鋳造製羽根車のクリープ強度、疲労強度の低下を防止すること

【図1】



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DOCUMENT-IDENTIFIER: JP 07208189 A

TITLE: SUPERCHARGER COOLING DEVICE OF ENGINE

PUBN-DATE: August 8, 1995

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NAME

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N/A

APPL-NO: JP06012068

APPL-DATE: January 10, 1994

INT-CL (IPC): F02B039/00, F01D025/12 , F02B029/04 , F02B037/00

ABSTRACT:

PURPOSE: To realize a practical operation without a fear of reducing the creep strength and the fatigue strength of an aluminum casting runner of the compressor of a supercharger, and without generating a thermal deformation of a bearing and its seal, under the condition of a high rotation and a high load of the engine, or under the condition that the outlet pressure of the compressor is high.

CONSTITUTION: The downstream side of an intercooler 5 provided to a suction pipe 4 connecting from the compressor 3 of a supercharger 1 to the intake manifold of an engine; and a ring form pocket 13 provided to the periphery of the compressor 3 and a bearing between an exhaust turbine 2 and the compressor 3; are connected by a cooling air piping 8, and an electromagnetic valve 9 is provided to the cooling air piping 8. A controller 10 to control to open and close the electromagnetic valve 9 according to the operating condition of the supercharger 1 is also provided.

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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : HINO MOTORS LTD

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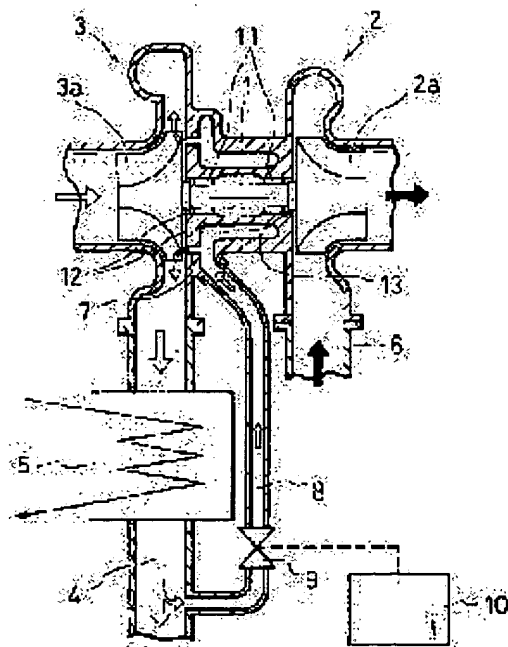
(72)Inventor : SUGIHARA HIROYUKI
AOYANAGI YUZO

(54) SUPERCHARGER COOLING DEVICE OF ENGINE

(57)Abstract:

PURPOSE: To realize a practical operation without a fear of reducing the creep strength and the fatigue strength of an aluminum casting runner of the compressor of a supercharger, and without generating a thermal deformation of a bearing and its seal, under the condition of a high rotation and a high load of the engine, or under the condition that the outlet pressure of the compressor is high.

CONSTITUTION: The downstream side of an intercooler 5 provided to a suction pipe 4 connecting from the compressor 3 of a supercharger 1 to the intake manifold of an engine; and a ring form pocket 13 provided to the periphery of the compressor 3 and a bearing between an exhaust turbine 2 and the compressor 3; are connected by a cooling air piping 8, and an electromagnetic valve 9 is provided to the cooling air piping 8. A controller 10 to control to open and close the electromagnetic valve 9 according to the operating condition of the supercharger 1 is also provided.



LEGAL STATUS

[Date of request for examination]

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converted registration]

[Date of final disposal for application]

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[Date of registration]

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CLAIMS

[Claim(s)]

[Claim 1] The supercharger cooling system of the engine characterized by to have the controller which connects the downstream and said compressor of the intercooler with which the inhalation-of-air system way connected to an engine intake manifold from said compressor was equipped in the supercharger of the engine which consists of an exhaust gas turbine and a compressor which rotates by this exhaust gas turbine by cooling-air piping, forms a solenoid valve in this cooling-air piping way, and carries out closing-motion control of this solenoid valve according to the operation situation of a supercharger.

[Claim 2] In the supercharger of the engine which consists of an exhaust gas turbine and a compressor which rotates by this exhaust gas turbine While connecting the downstream and said compressor of the intercooler with which the inhalation-of-air system way connected to an engine intake manifold from said compressor was equipped by cooling air piping An annular pocket is prepared in the periphery of the bearing of said exhaust gas turbine and compressor. The supercharger cooling system of the engine characterized by having the controller which connects this pocket and said cooling air piping, forms a solenoid valve in this cooling air piping way, and carries out closing motion control of this solenoid valve according to the operation situation of a supercharger.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to an engine supercharger cooling system.

[0002]

[Description of the Prior Art] The engine supercharger consists of compressors which rotate by the exhaust gas turbine and this exhaust gas turbine as everyone knows.

[0003]

[Problem(s) to be Solved by the Invention] When the impeller of a compressor was a product made from aluminum casting and it operated by high rotation and the high-pressure force ratio, the periphery section of an impeller became an elevated temperature, the creep strength of an ingredient and fatigue strength fell, and there was a possibility that practical use operation might become difficult. Moreover, there was a problem which a lubricating oil and exhaust gas reveal according to heat deformation of the turbine side shaft carrier seal section.

[0004] The purpose of this invention is offering the supercharger cooling system of the engine which solved the above-mentioned problem.

[0005]

[Means for Solving the Problem] The summary of this invention for attaining the above-mentioned purpose connects the downstream and said compressor of the intercooler with which the inhalation-of-air system way connected to an engine intake manifold from said compressor was equipped by cooling-air piping, forms a solenoid valve in this cooling-air piping way, and is equipped with the controller which carries out closing-motion control of this solenoid valve according to the operation situation of a supercharger in the supercharger of the engine which consists of an exhaust gas turbine and a compressor which rotates by this exhaust gas turbine.

[0006] In the supercharger of the engine which consists of an exhaust gas turbine and a compressor which rotates by this exhaust gas turbine While connecting the downstream and said compressor of the intercooler with which the inhalation-of-air system way connected to an engine intake manifold from said compressor was equipped by cooling air piping An annular pocket is prepared in the periphery of the bearing of said exhaust gas turbine and compressor, this pocket and said cooling air piping are connected, a solenoid valve is formed in this cooling air piping way, and it has the controller which carries out closing motion control of this solenoid valve according to the operation situation of a supercharger.

[0007]

[Function] A part of inhalation of air which carried out opening of the solenoid valve in the situation that a supercharger is operated by high rotation and the high-pressure force ratio, and was cooled by the intercooler by the above-mentioned configuration is supplied to a compressor and bearing by cooling air piping, and bearing and an impeller are cooled compulsorily.

[0008]

[Example] The example of this invention is explained based on a drawing below. In drawing 1 , 1 is a supercharger and consists of an exhaust gas turbine 2 which has impeller 2a, and a compressor 3 equipped with impeller 3a which rotates by this exhaust gas turbine 2.

[0009] Said exhaust gas turbine 2 is connected with the exhaust manifold and exhaust pipe 6 of ****, and said compressor 3 is connected by the intake manifold and inlet pipe 4 of ****.

[0010] Moreover, the intercooler 5 which cools the inhalation of air which carried out the temperature rise by the compressor 2 in the middle of said inlet pipe 4 is arranged.

[0011] This invention is the structure equipped with the controller 10 which forms a slit 7 in the downstream of said intercooler 5, the periphery section of impeller 3a of said compressor 3, and a corresponding location, connects the

downstream and said slit 7 of said intercooler 5 by the cooling air piping 8, forms a solenoid valve 9 in the middle of this cooling air piping 8, and carries out closing motion control of this solenoid valve 9 according to the operation situation of a supercharger 1.

[0012] Moreover, in addition to the aforementioned structure, the annular pocket 13 is formed in the periphery of the bearing 11 of impeller 2a of an exhaust gas turbine 2, and impeller 3a of a compressor 3, and this pocket 13 and said cooling air piping 8 are connected.

[0013] The operation situation of the supercharger 1 which carries out closing motion control of said solenoid valve 9 by the controller 10 inputs the outlet pressure of rotation of an engine, a load, or a compressor 3 into a controller 10, and the time of engine high rotation and a heavy load, or when the outlet pressure of a compressor 3 is high, it is carrying out opening control of the solenoid valve 9.

[0014] Since this invention is the structure as above-mentioned, the solenoid valve 9 has been closed in the field in which the outlet pressure of rotation of an engine, a load, or a compressor 3 does not affect impeller 3a of a compressor 3.

[0015] However, the time of the high rotation of the engine which affects impeller 3a of a compressor 3, and a heavy load, or when the outlet pressure of a compressor 3 is high, opening control of the solenoid valve 9 is carried out, and a part of inhalation of air cooled by the intercooler 5 is supplied to a compressor 3 through the cooling air piping 8 and a slit 7, it cools impeller 3a of a compressor 3 compulsorily, and controls the temperature rise of the periphery section of impeller 3a of a compressor 3.

[0016] Moreover, the annular pocket 13 is formed in the periphery of the bearing 11 of impeller 2a of an exhaust gas turbine 2, and impeller 3a of a compressor 3, bearing 11 and its seal section 12 are compulsorily cooled in the structure which connected this pocket 13 and said cooling air piping 8, and, in addition, the temperature rise of the periphery section of impeller 3a of a compressor 3 is controlled further.

[0017] Operation is made possible, without there being no possibility of falling the creep strength of impeller 3a of the compressor 3 made from aluminum casting and fatigue strength, and generating heat deformation of bearing 11 and its seal section 12 by this, the time of engine high rotation and a heavy load, or when the outlet pressure of a compressor 3 is high.

[0018]

[Effect of the Invention] This invention connects the downstream and said compressor of the intercooler with which the inhalation-of-air system way connected to an engine intake manifold from the compressor of a supercharger was equipped by cooling air piping as mentioned above. Form a solenoid valve in this cooling air piping way, and since it is the configuration equipped with the controller which carries out closing motion control of this solenoid valve according to the operation situation of a supercharger, the time of engine high rotation and a heavy load, or when the outlet pressure of a compressor is high, it sets. The fall of the creep strength of the impeller made from aluminum casting of a compressor and fatigue strength can be prevented. An annular pocket is prepared in the aforementioned configuration at the periphery of the bearing of an exhaust gas turbine and a compressor. With the configuration equipped with the controller which connects this pocket and said cooling air piping, forms a solenoid valve in this cooling air piping way, and carries out closing motion control of this solenoid valve according to the operation situation of a supercharger It has the effectiveness which enables practical use operation, without generating heat deformation of bearing and its seal section in addition to the aforementioned effectiveness.

[Translation done.]